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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

21.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.

Reference : AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **24010**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	265	265	1.1	98.9	95-100
22.4	5260	5525	23.0	77.0	60-80
11.2	5450	10975	45.7	54.3	40-60
4.75	4050	15025	62.6	37.4	25-40
2.36	3565	18590	77.4	22.6	15-30
0.600	2590	21180	88.2	11.8	8-22
0.075	2515	23695	98.7	1.3	0-8

Note:

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ಬೃ.ಬೆಂ.ಮ.ಪಾ., ಬೆಂಗಳೂರು-97

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21.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.

Reference : AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **24115**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	290	290	1.2	98.8	95-100
22.4	5565	5855	24.3	75.7	60-80
11.2	5290	11145	46.2	53.8	40-60
4.75	4010	15155	62.8	37.2	25-40
2.36	3515	18670	77.4	22.6	15-30
0.600	2590	21260	88.2	11.8	8-22
0.075	2605	23865	99.0	1.0	0-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/AIV/2014-15 21.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	21.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	20.58	20.79	
	100* (W_2/W_1)%			**20.68**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/S-T/2014-15 21.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager**, KRIDL, Bangalore.
Name of Work	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	21.07.2014

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Result : Flakiness Index = **11.98%**

Elongation Index = **13.89%**

Result : Combined Flakiness & Elongation index 25.87%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/AIV/2014-15 23.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	23.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.05	21.20	**21.13**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Shape_T/2014-15 : 23.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	: AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 23.07.2014

Result : Flakiness Index = **12.98%**

Elongation Index = **13.02%**

Result : Combined Flakiness & Elongation index **26.00%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Stripping/2014-15 23.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	23.07.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.40	96.60
2	3.4		
3	3.5		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Sp_Wa/2014-15 23.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
Reference	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	23.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2026	2022	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1271	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2020	2022	2023	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	750	751	756	
6	Weight of oven dried aggregate	W_4 g	2009	2011	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.679	2.678	2.652	2.670
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.719	2.718	2.717	2.718
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.55%	0.55%	0.90%	0.66%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Bitumen/2014-15 23.07.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, (Change of Place to Balaji Layout Main Roads), BBMP, Bangalore.
REFERENCE	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
SAMPLE I/D	Asphalting to Singapura Layout Roads in Ward No.11
DATE OF TESTING	23.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	474.5
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.50
7. Bitumen content in %	5.10	5.10
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	35.26	7.43	7.43	92.57	90-100
4.75	259.6	54.71	62.14	37.86	35-51
2.36	56.35	11.88	74.02	25.98	24-39
1.18	41.25	8.69	82.71	17.29	15-30
0.3	28.36	5.98	88.69	11.31	9-19
0.075	26.35	5.55	94.24	5.76	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	24.56	4.91	4.91	95.09	90-100
4.75	240.3	48.06	52.97	47.03	35-51
2.36	90.36	18.07	71.04	28.96	24-39
1.18	53.32	10.66	81.71	18.29	15-30
0.3	33.25	6.65	88.36	11.64	9-19
0.075	25.32	5.06	93.42	6.58	3-8

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21.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25100**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	295	295	1.2	98.8	95-100
22.4	5520	5815	23.2	76.8	60-80
11.2	5675	11490	45.8	54.2	40-60
4.75	4025	15515	61.8	38.2	25-40
2.36	3850	19365	77.2	22.8	15-30
0.600	2590	21955	87.5	12.5	8-22
0.075	2860	24815	98.9	1.1	0-8

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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Bitumen/2014-15 23.07.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads, Construction of Culvert and Asphalting to Singapura Layout Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VSD/PR/175/9/2014-15 Dated: 19.07.2014
SAMPLE I/D	Asphalting to Singapura Layout Roads in Ward No.11
DATE OF TESTING	23.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	473	475
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	27	25.00
7. Bitumen content in %	5.40	5.00
8. Average	**5.20**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	37.25	7.88	7.88	92.12	90-100
4.75	260.3	55.03	62.91	37.09	35-51
2.36	57.13	12.08	74.99	25.01	24-39
1.18	40.32	8.52	83.51	16.49	15-30
0.3	29.45	6.23	89.74	10.26	9-19
0.075	28.52	6.03	95.77	4.23	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	26.72	5.34	5.34	94.66	90-100
4.75	242.3	48.46	53.80	46.20	35-51
2.36	92.13	18.43	72.23	27.77	24-39
1.18	52.13	10.43	82.66	17.34	15-30
0.3	32.56	6.51	89.17	10.83	9-19
0.075	22.45	4.49	93.66	6.34	3-8

Note:

Þ This test report should not be reproduced except in full, without written approval of the laboratory

Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 15 days from the date of testing

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